CATALOG DOCUMENTATION
NATIONAL COASTAL ASSESSMENT- NORTHEAST DATABASE
YEAR 2001 STATIONS
WATER COLUMN NUTRIENTS DATA: "NUTRNTS"

TABLE OF CONTENTS

1. DATASET IDENTIFICATION

1.1 Title of Catalog document
National Coastal Assessment-Northeast Region Database
Year 2001 Stations
Water Column Nutrients Data

1.2 Authors of the Catalog entry
John Kiddon, U.S. EPA NHEERL-AED
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1.3 Catalog revision date
December 29, 2003

1.4 Dataset name
NUTRNTS

1.5 Task Group
National Coastal Assessment-Northeast

1.6 Dataset identification code
004

1.7 Version
001

1.8 Request for Acknowledgment
EMAP requests that all individuals who download EMAP data acknowledge the source of these data in any reports, papers, or presentations. If you publish these data, please include a statement similar to: "Some or all of the data described in this article were produced by the U. S.

Environmental Protection Agency through its Environmental Monitoring and Assessment Program (EMAP)".

2. INVESTIGATOR INFORMATION (for full addresses see Section 13)

2.1 Principal Investigators

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Donald Cobb, U.S. EPA NHEERL-AED

2.2 Sample Collection Investigators

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2.3 Sample Processing Investigators

Not Applicable

3. DATASET ABSTRACT

3.1 Abstract of the Dataset

The NUTRNTS data file reports the concentrations of nutrients and related parameters measured in the National Coastal Assessment during the summer of 2001. Included is information regarding silicate, ammonium, nitrate and nitrite, nitrite, orthophosphate, chlorophyll *a*, and total suspended solids. Information is also reported for ancillary analytes measured by a subset of Northeast states. Results are generally reported for three water layers—surface, mid-depth, and bottom, except for shallow stations (< 2m), in which case a single mid-depth measurement is reported. Only data for the northeastern states (ME through DE) are included here. One record is presented for each analyte measured per level per sampling event.

3.2 Keywords for the Dataset

Silicate, ammonium, nitrate, nitrite, orthophosphate, total suspended solids, chlorophyll *a*

4. OBJECTIVES AND INTRODUCTION

4.1 Program Objective

The National Coastal Assessment (NCA) is a national monitoring and assessment program with the primary goal of providing a consistent evaluation of the estuarine condition in U.S. estuaries. It is an initiative of the Environmental Monitoring and Assessment Program (EMAP), and is a partnership of several federal and state environmental agencies, including: EPA's Regions, Office of Research and Development, and Office of Water; state environmental protection agencies in the 24 marine coastal states and Puerto Rico; and the United States Geological Survey (USGS) and the National Oceanic and Atmospheric Agency (NOAA). The five-year NCA program was initiated in 2000, and is also known as the Coastal 2000 Program.

Stations were randomly selected using EMAP's probabilistic sampling framework and were sampled once during a summer index period (June to October). A consistent suite of indicators was used to measure conditions in the water, sediment, and in benthic and fish communities. The measured data may be used by the states to meet their reporting requirements under the Clean Water Act, Section 305(b). The data will also be used to generate a series of national reports characterizing the condition of the Nation's estuaries.

4.2 Dataset Objective

The NUTRNTS file reports the concentrations of nutrients and related parameters measured in 2001 in the surface, mid-depth, and bottom layers of the water column in Northeast U.S. estuaries.

4.3 Background Discussion

A two-year sampling design was employed for 2000-2001 NCA program in the Northeast. Analysts may therefore wish to consider the two years of data together. This database contains data collected in 2000 from the Northeast component of the NCA, measured in the estuaries of the states Maine through Delaware.

Nine federal-state cooperative agreements were formed to conduct the NCA program in Northeast U.S., as is designated by the parameter ST_COOP (see Section 4.4). Samples collected by the ST_COOP were analyzed either by a national lab under contract to the EPA or by in-state labs, as designated by the parameter LABCODE. The Table below indicates which analytes were measured, by year and by lab code. Note that samples for ST_COOP = DE were analyzed by the national lab in 2000 and by a state lab in 2001.

LABCODE	CT		DE	NAT		MA		NJ		NY		Total
ANALYTE	2000	2001	2001	2000	2001	2000	2001	2000	2001	2000	2001	
BIOSI	77	96										173
*CHLA	77	95	23	293	380	74	69	75	37	67	33	1223
DOC	77	95										172
*NH4	77	44	23	300	380	71	83	78	37	32	33	1158
*NO2			23	300	380			78	36			818
*NO23	77	71	23	300	380	71	84	78	37	32	33	1186
NO3			23		120							143
ORG-N	44											44
PC	66	94										160
PHAE						74	89					163
PHOSP	74	94										168
PN	66	93										159
*PO4F	74	95	23	300	380	71	92	78	37	32	33	1215
POC						73	99					172
PON						73	99					172
*SI	77	96		300	380	71	91			32	33	1080
TDN	77	95										172
TDP	76	95										171
*TSS	70	95	23		359	73		78	37	47	32	814
UREAP											33	33
Total	1009	1158	147	1809	2568	651		465	216	242	230	8495

* NCA core nutrient indicators

The core suite of NCA nutrient-related analytes are noted by asterisks in the table above, and include silicate, ammonium, nitrate plus nitrite, nitrite, orthophosphate, chlorophyll *a*, and total suspended solids. Additional analytes were also measured by some states, and their concentration reported in this summary database. These ancillary analytes include; for NY: urea; and for CT: biogenic silica, dissolved organic carbon, nitrate, particulate carbon, particulate nitrogen, total dissolved nitrogen, and total dissolved phosphorus.

Water samples were generally collected in the surface mid-depth, and bottom water layers, However, at some shallow stations (<2 m), water was collected at mid-depth only. Results from these shallow stations are designated by the parameter LAYER = "Single." Users may wish to include these single-layer data with surface and/or bottom-layer data during analysis.

Some of the measured values in this file are smaller than the Method Detection Limit (MDL). Such 'non-detects' are reported as zero in this file, and the record is highlighted with the parameter QACODE = NUT-A. The user may wish to substitute values other than zero for the result, e.g., set the non-detect value to the MDL value, half the MDL value, etc.

NCA planners provide two alternate locations for a station location in the event that the original location cannot be sampled. The parameter STA_ALT indicates whether the station location was the original site, first alternate, or second alternate—STA_ALT = "A", "B", or "C", respectively. Also refer to discussion in the STATIONS metadata file regarding use of this parameter during analysis of the data.

Field replicate samples (i.e., samples taken from separate casts) were collected at about 10% of stations for quality assurance purposes. The parameter REP_NUM indicates whether the sample is the original—and often only—sample (REP_NUM = 1) or a replicate field sample (REP_NUM = 2). When expressing estuarine condition (e.g., by calculating weighted averages), the user may wish to disregard results from replicate samples to avoid "double counting". Note that replicate samples from the *same* cast were also generally collected as a backup in case of loss and for use in laboratory QA procedures. Results from such "laboratory splits" are not included in this summary database, but are available from the Data Access Contact Personnel (Section 10.3).

4.4 Summary of Dataset Parameters

* denotes parameters that should be used as key fields when merging data files

PARAMETER LABEL
*STATION Station Identifier
*STAT_ALT Station Location Alternates
A = As originally planned

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            B = First alternate
            C = Second alternate
  *EVNTDATE Event Date
  LAYER     Water layer sampled for nutrients
            Bottom      Bottom layer measurement
            Mid         Mid-water measurement
            Surface     Surface layer measurement
            Single      Single measurement only (in shallow water)
  REP       Replicate Sample Number
            1     Original sample
            2     Replicate sample (field replicate)
  LABCODE   Laboratory responsible for processing of samples
            CT    CT state lab
            DE    DE state lab (2001 only)
            MA    MA state lab
            NJ    NJ state lab
            NY    NY state labs
            NAT   National contract lab (ME, NH, RI, NJ-C, NJ-DB, DE)
  ANALYTE   Analyte Code
            SI    Dissolved Silica (mg/L as Si)
            NH4   Dissolved Ammonia (mg/L as N)
            NO23  Diss Nitrite and Nitrate (mg/L as N)
            NO2   Dissolved Nitrite  (mg/L as N)
            PO4F  Dissolved Orthophosphate (mg/L as P)
            TSS   Total Suspended Solids (mg/L)
            CHLA  Chlorophyll a (ug/L)
            TDN   Total Dissolved Nitrogen (mg/L as N)
            TDP   Total Dissolved Phosphorus (mg/L as P)
            PHOSP Tot Particulate Phosphorus (mg/L as P)
            BIOSI Biological Silica (mg/L as Si)
            DOC   Dissolved Organic Carbon (mg/L as C)
            PC    Particulate Carbon (mg/L as C)
            PN    Particulate Nitrogen (mg/L as N)
            UREAP Urea (mg/L as N
  CONC      Concentration
  UNITS     Unit of Measure
  QACODE    QA Qualifier Code
            NUT_A   Concentration below detection limit; CONC reported as zero
  MDL       Method Detection Limit
```

5. DATA ACQUISITION AND PROCESSING METHODS

5.1 Data Acquisition

The sample collection methods used by USEPA trained field crews will be described here. Any significant variations by NCA partners are noted in Section 5.1.12. Details regarding NCA partners are reported in the STATIONS data file.

5.1.1 Sampling Objective

Seawater was collected and filtered for use in the measurement of nutrient, phytoplankton and total suspended solids concentrations. Samples were collected in the surface, mid, and bottom water layers,

except at some shallow stations (water depth < 2m) where a single mid-depth sample was taken.

5.1.2 Sample Collection: Methods Summary

A seawater sample was collected from surface, mid-depth, and bottom water layers with a 5L Go-Flo® sampling bottle. At some shallow locations (water depth < 2m) only one mid-depth water sample was taken. Duplicate water samples from the same cast were filtered aboard ship with 0.7-micron glass-fiber filter pads (not all duplicates were analyzed), and both the filtered water and filter were immediately frozen. Replicate field samples were also taken from separate casts at approximately 10% of the stations to evaluate the repeatability of the sampling procedure.

5.1.3 Beginning Sampling Dates

25 June 2001

5.1.4 Ending Sampling Dates

31 October 2001

5.1.5 Sampling Platform

Samples were collected from gasoline or diesel powered boats 18 to 133 feet in length

5.1.6 Sampling Equipment

5 L Go-Flo® sampling bottle

5.1.7 Manufacturer of Sampling Equipment

Not applicable

5.1.8 Key Variables

Not applicable

5.1.9 Sample Collection: Calibration

The sampling gear does not require calibration

5.1.10 Sample Collection: Quality Control

Duplicate field samples from independent casts were taken, representing about 10% of all events. All parameters were measured on these duplicates, and the measurement precision is reported in Section 9.3.

5.1.11 Sample Collection: References

Strobel, C.J. 2000. Environmental Monitoring and Assessment Program: Coastal 2000 - Northeast component: field operations manual. Narragansett (RI): U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Atlantic Ecology Division. EPA/620/R-00/002. 68 p.

U.S. EPA. 2001. National Coastal Assessment: Field Operations Manual. U.S. Environmental Protection Agency, Office of Research and Development, National Health and Environmental Effects Research Laboratory, Gulf Ecology Division, Gulf Breeze, FL. EPA/620/R-01/003. 72 p.

5.1.12 Sample Collection: Alternate Methods

Not Applicable

5.2 Data Preparation and Sample Processing

The processing procedures of the core NCA water parameters described here are the methods of the national contract laboratory (see Section 4.3). Any significant variations in procedures used by other state labs are noted in Section 5.1.12.

5.2.1 Sample Processing Objective

Water samples were analyzed to measure the concentrations of water column nutrients, total suspended solids and phytoplankton pigments.

5.2.2 Sample Processing: Methods Summary

Filters and filtrate were delivered frozen from sampling locations following a filtration operation using a 0.7 micron glass-fiber filter (see Section 5.1.2). NH4, PO4, NO23, NO2, and Si were measured by analyzing filtered water with a segmented continuous flow analyzer. Chlorophyll *a* pigments were extracted from filter with 90% acetone and measured without acidification, using the Weshmeyer method. TSS was measured by drying the filter at 103 to 105 ºC followed by weighing.

5.2.3 Sample Processing: Calibration

Standard laboratory procedures were followed to assure analytical instruments were calibrated.

5.2.4 Sample Processing: Quality Control

Approximately 5% of all filtered water samples were reanalyzed by the analytical laboratory to determine analytical repeatability of the analytical procedure. Another 5% of dissolved water samples were spiked with a known quantity of constituent and reanalyzed as a test for recovery efficience. For particulate constituents, 10% of all samples were reanalyzed (particulate samples cannot be spiked). Processing quality was considered acceptable if duplicate analyses were consistent within 10% and spiked analyses were as expected within 15%.

5.2.5 Sample Processing: References

D'Elia, C.F., Connor, E.E., Kaumeyer, N.L., Keefe, C.W., Wood, K.V., and Zimmermann, C.F. (1997). Nutrient Analytical Services Laboratory Standard Operating Procedures. Technical Report Series 158-97. Chesapeake Biological Laboratory, University of Maryland Center for Environmental Science, Solomons, MD: 77 pp.

U.S. EPA. 2001. Environmental Monitoring and Assessment Program (EMAP): National Coastal Assessment Quality Assurance Project Plan 2001-2004. U.S. Environmental Protection Agency, Office of Research and Development, National Health and Environmental Effects Research Laboratory, Gulf Ecology Division, Gulf Breeze, FL. EPA/620/R-01/002. 189 p.

Welschmeyer, N.A. 1994. Fluorometer analysis of chlorophyll *a* in the presence of chlorophyll *b* and pheopigments. Limnology and Oceanography 39:1985-1992.

5.2.6 Sample Processing: Alternate Methods
Not Applicable

6. DATA ANALYSIS AND MANIPULATIONS

6.1 Name of New or Modified Values
Not applicable

6.2 Description of Data Manipulation
Analyte concentrations smaller than the method detection limit were reported as zero (see Section 4.3).

7. DATA DESCRIPTION

7.1 Description of Parameters

7.1.1 Components of the Dataset

NAME	TYPE	LENGTH	LABEL
STATION	Char	9	Station Identifier
STAT_ALT	Char	1	Station Location (A,B or C)
EVNTDATE	Num	8	Event Date
LAYER	Char	8	Water Layer of Nutrients Sample
REP	Num	4	Replicate Sample Number
ANALYTE	Char	5	Analyte Code
CONC	Num	8	Concentration
UNITS	Char	10	Unit of Measure
QACODE	Char	5	QA Qualifier Code
MDL	Num	8	Method Detection Limit
LABCODE	Char	5	Lab identifier

7.1.2 Precision of Reported Values
The values are accurate to no more than three significant digits; however more significant digits may be reported in the dataset because of formatting restrictions.

Parameter	Description	Precision	Min	Max	units
REP_NUM	Replicate Sample Number		1	2	mg/L
SI	Dissolved Silica as Si	0.01	0.02	8.76	mg/L
NH4	Dissolved Ammonia as N	0.001	0.004	2.28	mg/L
NO23	Diss Nitrite and Nitrate as N	0.0001	0.002	4.61	mg/L
NO2	Dissolved Nitrite as N	0.0001	0.001	0.131	mg/L
PO4F	Dissolved Phosphate as P	0.001	0.003	0.493	mg/L
CHLA	Chlorophyll *a*	0.01	0.12	95.0	ug/L
TSS	Total Suspended Solids	0.1	1.0	272	mg/L

7.1.3 Minimum Value in Dataset

See Section 7.1.2

7.1.4 Maximum Value in Dataset
See Section 7.1.2

7.2 Data Record Example

7.2.1 Column Names for Example Records

STATION	STAT_ALT	EVNTDATE	LAYER	REP	ANALYTE	CONC	UNITS	QACODE	MDL	LABCODE

7.2.2 Example Data Records

STATION	STAT_ALT	EVNTDATE	LAYER	REP	ANALYTE	CONC	UNITS	QACODE	MDL	LABCODE
CT01-0002	A	9/26/01	Single	1	BIOSI	1.32	mg/l		.	CT
CT01-0002	A	9/26/01	Single	1	CHLA	4	ug/l		.	CT
CT01-0002	A	9/26/01	Single	1	DOC	2.6	mg/l		.	CT

8. GEOGRAPHIC AND SPATIAL INFORMATION

8.1 Minimum Longitude (Westernmost)
-75.6977 decimal degrees

8.2 Maximum Longitude (Easternmost)
-67.0482 decimal degrees

8.3 Minimum Latitude (Southernmost)
38.4739 decimal degrees

8.4 Maximum Latitude (Northernmost)
45.1848 decimal degrees

8.5 Name of Region
The National Coastal Assessment Northeast Region covers the northeastern US coastline from Maine to Delaware.

9. QUALITY CONTROL AND QUALITY ASSURANCE

9.1 Measurement Quality Objectives
The measurement quality objectives of the EMAP-Estuaries program specify accuracy and precision requirements of 10% for measured analytes See U.S. EPA for details.

9.2 Data Quality Assurance Procedures
QA procedures included running blanks, spiked samples, and standard reference materials with each batch of samples. Any batch failing to meet the specifications presented in Section 9.1 was reanalyzed or rejected.

9.3 Actual Measurement Quality
All of the data reported in this data file met the QA specifications listed in Section 9.1.

10. DATA ACCESS

10.1 Data Access Procedures

Data can be downloaded from the web
http://www.epa.gov/emap/nca/html/regions/index.html

10.2 Data Access Restrictions

None

10.3 Data Access Contact Persons

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10.4 Dataset Format

ASCII (CSV) and SAS Export files

10.5 Information Concerning Anonymous FTP

Not available

10.6 Information Concerning WWW

No gopher access, see Section 10.1 for WWW access

10.7 EMAP CD-ROM Containing the Dataset

Data not available on CD-ROM

11. REFERENCES

Strobel, C.J. 2000. Environmental Monitoring and Assessment Program: Coastal 2000 - Northeast component: field operations manual. Narragansett (RI): U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Atlantic Ecology Division. EPA/620/R-00/002. 68 p.

U.S. EPA. 2001. National Coastal Assessment: Field Operations Manual. U.S. Environmental Protection Agency, Office of Research and Development, National Health and Environmental Effects Research Laboratory, Gulf Ecology Division, Gulf Breeze, FL. EPA/620/R-01/003. 72 p.

U.S. EPA. 2001. Environmental Monitoring and Assessment Program (EMAP): National Coastal Assessment Quality Assurance Project Plan 2001-2004. U.S. Environmental Protection Agency, Office of Research and Development, National Health and Environmental Effects Research Laboratory, Gulf Ecology Division, Gulf Breeze, FL. EPA/620/R-01/002. 189 p.

12. TABLE OF ACRONYMS

AED	Atlantic Ecology Division
CSC	Computer Sciences Corporation
deg C	degrees Centigrade
EMAP	Environmental Monitoring and Assessment Program
EPA	Environmental Protection Agency
m	Meter
mg/L	Milligram per Liter
ug/L	Microgram per Liter
NCA	National Coastal Assessment
NHEERL	National Health and Environmental Effects Research Laboratory
QA/QC	Quality Assurance/Quality Control
WWW	World Wide Web

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